Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

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With the Editor

HERE in the office of INDUSTRIAL FINISHING the daily mail reveals much that is significant in the trend of thought, effort and interest among those identified in various capacities with modern finishing. One striking feature that comes to our attention repeatedly is the demand for back copies of INDUSTRIAL FINISHING—another phase of *Reader Interest.*

More concerns and individuals are developing a keen interest and a compelling desire for specific information on industrial finishing. These are new subscribers. Among the older regular readers, changes in places of business or in residence have been responsible for their missing certain back copies. Others have missed copies by permitting their mail to be delivered to the "main office" where perhaps someone beat them to it, or later borrowed their copy without authority.

Copies of INDUSTRIAL FINISHING that get away from a man this way often contain information that is of more than ordinary interest to him, and while some readers do write in for missed copies, it is probable that others hesitate or neglect to do so. You are right in assuming that our supply of back numbers is limited, but as long as they last we are glad to accommodate those who write for them.

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Lacquer Thinners; Fortifiers

Lacquer expert and authority explains some things about lacquer thinners, or reducers, and fortifiers that every buyer and user of modern pyroxylin lacquers should know for future guidance.

By S. P. Wilson

WITH the vast increase in the use of lacquers there has come a corresponding increase in the use of the accompanying thinners. The finisher is often perplexed by the nature of these thinners, or reducers as they are sometimes called, and the more so since almost all lacquer manufacturers insist that only their thinner will work with their lacquer. To a finisher accustomed to use turpentine or naphtha to reduce his paints or varnishes, and alcohol for his shellac, this probably seems peculiar.

Function of a Thinner

Naturally, the purpose of a thinner is to cut the viscosity of a lacquer to a point where it can be applied properly, whether it be by spray gun, brush or dipping. The proportions of thinner to add to lacquer vary widely. Some wood lacquers are used full body, while some metal lacquers applied by dipping are reduced three parts of thinner to one of lacquer; all proportions in between these are used.

There is a tendency among finishers to believe that the more thinner they use the more economical their work is. While this is true to some extent, it must be remembered that all lacquers are chiefly composed of solvents, or thinners, which are necessarily lost in the application of the material.

Since it takes a certain number of ounces per square yard to do the job, it can be readily seen that the smallest volume of added thinner which will properly convey the necessary solids to the surface is really the most economical proportion. A thick lacquer, requiring much thinning and several coats, may thus be more expensive in the end than a higher priced lacquer of low viscosity and high solid percentage, which requires little thinner and covers in considerably fewer coats.

In general, lacquer for material like wood, or other porous substances requiring a fairly thick film, should be reduced as little as possible, while on the other hand metal lacquers may be considerably reduced. If buffing or polishing is to be done a thicker film is needed, and any reduction should be only sufficient to make the material flow or spray properly.

Ingredients of Thinners

Thinners are almost always mixtures of three types of compounds. These include esters, like ethyl and butyl acetates; alcohols like denatured alcohol, butanol or fusel oil; and hydrocarbons like benzol, toluol and gasoline. These are blended together so as to keep the ingredients of the lacquer in complete solution, to reduce the viscosity, and to give the right flow to the lacquer.

Where lacquer is to be applied on a paint undercoat, it is generally agreed that the thinner should have the minimum amount of solvents that might bite into the paint; but for lacquer that is to go directly on metal, this, of course, is not a consideration.

Reducers for brushing lacquers must be such as will not attack the undercoat; they must contain enough high-boiling solvents to keep the lacquer open long enough to permit of easy brushing, flowing out over brush marks and eliminating sags. The formulation of a suitable brushing lacquer is one of the most difficult in the industry. Dipping lacquers are similar, except that they are primarily designed to secure a good even flow with the least drip possible, and to permit of a nice gloss on the work. It has been found that a good reducer helps greatly the gloss of a lacquer.

Blushing Easily Prevented

As everyone knows, one of the worst troubles in lacquering is the blooming or blushing on warm moist days. This characteristic is most marked in clear lacquers, where it appears as a white cloud in the film, but it is also visible in lacquer enamels, where it dulls the gloss and hazes the color. The choice of a proper reducer can almost always eliminate this trouble.

Some lacquers and reducers are sold which practically never blush. However, these are expensive, and it seems most economical to adopt a moderate priced combination that works satisfactorily throughout the year, and then keep on hand some fortifier, or retarder, with which to doctor up the lacquer in bad weather. The finisher thus avoids paying for the expensive blush-preventing ingredients during the season when they are not necessary. An excellent fortifier can be made of equal parts of butyl propionate and refined fusel oil. A small percentage of this liquid will almost always eliminate blushing troubles.

Care of Dip Tanks

In many plants where dip tanks are used finishing troubles are encountered that seem puzzling. The finishing foreman may be sure he and his men are doing their best, and perhaps this is true so far as their individual work is concerned; yet the various finishes somehow do not come out as bright and clear as these should.

How many times is attention turned to the different tanks used in the finishing processes? The men mixing the materials may be sure they are using the right formulas, to the proper degree; yet no matter what combinations they use the work suffers to some extent if the finishing tanks are neglected.

In some shops the matter of cleaning is attended to periodically and rigidly. Some concerns have even provided extra tanks for use in case of emergencies. This is farsighted procedure, since one can never tell when a tank may leak or otherwise not be usable. Extra tanks, moreover, make possible the preparation of more finishes when the plant is unduly rushed.

In one shop the cleaning of tanks is regularly attended to by the same man—one who understands tanks. This man is an experienced finisher himself. He appreciates the necessity of good, clean tanks for satisfactory fin-

ishes. With him it is not merely a fill-in job—something to get through with quickly. He scrubs all tanks thoroughly with a stiff bristle brush, from top to bottom and end to end, not overlooking particularly the corners where dregs and other accumulations so easily gather. Following this procedure, the tanks are flushed with fresh water. Once a tank is thoroughly clean, the work later comes easier.

Management must not overlook here that neglect of regular and thorough tank-cleaning causes the men about the tanks, sometimes, to have less regard for the quality of the finishes.

Tanks should be protected on the outside, too, by means of good preservative paints. Here the brighter, cleaner tanks suggest cleaner work on the part of the men. Good tanks should be installed and they should be kept in good condition. When daily attention is given the matter, and when care is taken to keep the floor near the tanks as free as possible of sloppiness, the good effect in the end will show itself not only in the cleaner conditions, but finishes really are sure to come out better.

When tanks have leaks these should be repaired so soon as possible. Corroded metal lining should have early attention. Copper sheeting is best for the lining of wooden tanks, and though it is known for its durability, leaks may occur sooner than expected, by reason of faulty construction.

Sometimes there is a weak spot in the metal. The best move is to solder small leaks quickly. Coal-tar pitch may be applied to small holes. Sometimes a quite satisfactory job can be done by applying cements in small cracks when the tank is thoroughly dry, if the leak extends through metal and wood. The metal should not be put in before the other work is dry, of course; and no water should be permitted to flow into the tank.

Portland cement of a good consistency can be worked in from the tank's exterior, leaving this set; then the work can be gone over with a good protective coat of material such as coal-tar pitch. There are also cements to stop leaks in metal which are used on motor radiators.—F. V. Faulhaber.

Keep all cans tightly corked, if they contain highly inflammable liquids such as benzine, benzole, gasoline, etc. Never allow finishishing liquids of any kind to run through cracks in the floor. Fires have been caused through neglect in matters of this kind. The proper thing to do is have the cracks closed, then keep the material off the floor.

Practical Handbook on Dipping and Spraying Finishes in Industry.

"Painting by Immersion and by Compressed Air" is the title of a 270-page cloth bound book with 150 illustrations, which is published by The Trade Papers Publishing Co., Ltd., 301 Bank Chambers, 329 High Holborn, W. C. 1. London, England. The book bears the date 1925 and is a second impression (edition).

Arthur Seymour Jennings, the author, is editor of "The Decorator" and author of several books on decorating and painting. This book deals with the application of paints and finishes by dipping and spraying. It illustrates and describes not only modern English equipment and methods but also much of what is modern in industrial establishments in the U. S. A. It should prove an interesting and valuable handbook for anyone interested in modern industrial finishing.

Crackle Finish Facts

This clear-cut presentation of the underlying principles of cause and effect concerning cracked finishes and crackle finishes, reveals many points of interest on a timely subject.

By W. H. Martindale

IT HAS often been said that no three users of finishing materials can be found at one time who will agree exactly upon all points of finishing practice, type of materials to use, schedule of operations or causes of trouble. In the same way there is often a disagreement as to what causes this or that, and as to the chemical or physical action that takes place in such instances.

It is only by good material, wholesome, liberal discussion of these questions, however, that a better understanding can be brought about. If at times some of us cannot agree with statements which we may see in printed articles in our trade papers, let us not say "that man doesn't know what he is talking about" and pass the matter by.

The writer of the article in question no doubt tried to put into words the thoughts which he had on that particular subject as a result of his experience. Perhaps, however, his experiences had not included certain other experiences which we may have had and this explains our lack of agreement with him. In such instances let us state our side of the case in a frank, non-prejudiced manner, free from all personal criticism or resentment. and all parties will be benefited thereby.

An Acknowledged Mistake

The short article on Crackle Finishes in the April, 1926, issue of INDUSTRIAL FINISHING is an example of certain statements with which others may not agree. In that article the statement is made that "Crackle" is "produced by nothing more nor less than the drying of the last coat of varnish or lacquer upon a quicker drying undercoat." This statement is entirely contrary to my understanding of the cause of cracking, and I am inclined to feel like the company writing in June issue page 56, that "J. I. C." merely stated the matter in the reverse of what he intended to say.

It has always been my understanding, based on several years of intimate experience, that whenever cracking or checking takes place, the fundamental cause of it is due to a top coat being shorter or less elastic than a bottom coat. This is the opposite condition to the explanation to "Crackle" given by J. I. C. when he says, "with the outer coat made softer, say a lacquer containing some linseed oil, and the undercoat hard, the last coating is bound to dry slowly, but at last it will pull itself into the form of patches separated by very irregular cracks."

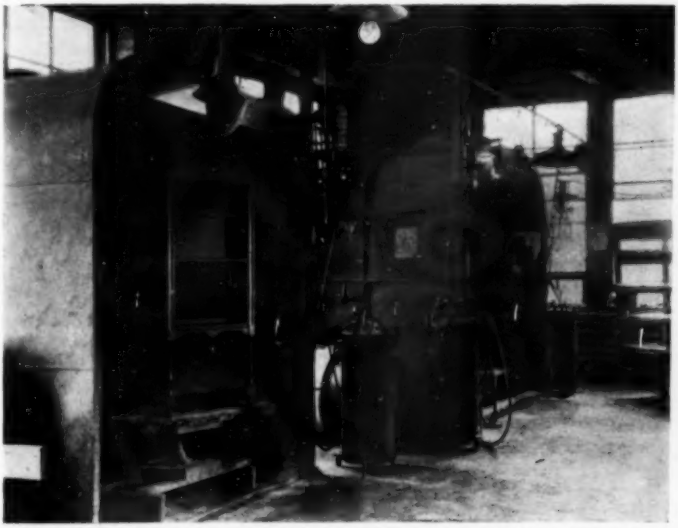
Preventing Cracked Finish

The fact of the matter is, that in finishing automobiles and all other similar objects it has always been a cardinal principle to never apply a harder-drying, less elastic coat over a softer one; this is to prevent cracking from taking place. The primer on an

automobile body must dry hard and be only elastic enough to adhere well to the metal and not be cracked by the expansion and contraction of the metal. Following this are several coats of hard-drying, comparatively short-oiled surfacing coats which dry as hard as a rock and are sanded to a smooth surface.

Then, in the old days, came several coats of rubbing varnish or color varnish which was more elastic than the surfacing materials but less elastic than the finishing materials. Finally the coat of finishing varnish, which was very long in oil and very elastic, was applied. This was the only safe way to prevent cracking and each coat had to be dry through and through before the next one was applied.

Even when the relative elasticity of the various coats was correct, cracking trouble was often encountered due to the bottom coats not being dry before the final coats were applied. Most paint and varnish materials have a tendency to dry from the top down, that is, they will harden on top within a few hours and yet be more or less soft underneath, requiring considerable time before they are hardened through the entire thickness of the coating. Suppose another coat is applied before this oxidation has proceeded far enough. What happens? The new coat begins to harden from the top down and soon forms a layer which prevents the oxygen from getting to the bottom of the first coat of only partially dried material.



Two spray booths located side by side in phonograph cabinet factory. The booth in background is centrally divided by a plywood curtain, and each side of the booth is fitted with a separate stand and spray-gun equipment to permit two men to work at the same booth.

If the last coat stands long enough it will dry through and through and yet the bottom of the first mentioned coat may not be thoroughly dried. If the finish is subjected to a change in temperature at this time there will be an expansion or contraction of the metal and the finishing material will have to expand and contract also. Now the portion of the film which is not thoroughly dried will expand and contract over a greater distance, with a given change in temperature, than will the hardened top film. The result will be that the top film will be broken and checks or cracks will appear.

Not only will this happen but, regardless of whether any great changes in temperature take place, there is danger of checking under the above mentioned conditions, due solely to the fact that as the undried portion of the film finally becomes dry it will shrink ever so slightly in volume and since the top film is already dry and under a strain similar to that of a rubber band drawn tight, it will not be sufficiently elastic to change shape with the under portion; consequently it will be broken in pieces as the under portion shrinks in volume.

An Established Fact

In fact, any condition which causes a portion of the under coats to be more elastic or softer than the top coats, will cause cracking. This is what takes place when an elastic color varnish is used and a less elastic clear rubbing varnish is used over it.

The more elastic material will expand and contract over a greater distance with a given change of temperature than the less elastic material, and as a result the top film will be broken or checked. A good example of this is seen in the drying of mud under a hot sun on the river bank. The top dries first and becomes very hard, shrinking in volume as it dries. Later, as the drying proceeds downward, the top film of mud is no longer sufficiently elastic and it cracks into sections of irregular size and shape, the cracks becoming larger and deeper as the drying proceeds.

Underlying Principles

What has all this lengthy explanation to do with the new so-called "Crackle Effect?" Merely that the underlying principles are the same when we got cracks where we did not want them, as today when we strive to produce cracks quickly in the proper size, depth and pattern. What caused cracking in the old days produces the modern "Crackle"—the under film is softer or more elastic than the top film. Let us see just what happens with the use of modern crackle lacquers.

Modern Crackle Lacquers

In the first place there must be one or more coats of ordinary nitro-cellulose lacquer—either clear or colors—on the surface before the crackle lacquer is applied. This is so the solvents from the crackle lacquer can partially soften these coats when it is applied and aid in producing the crackle. The crackle lacquer itself contains very little "binder," or elastic liquid, and it has a very large proportion of pigment and reducer.

When the crackle lacquer is applied the solvents from it partially soften the under coats of lacquer. Due to the large pigment content and the type of reducer in the crackle lacquer, the crackle coat begins to dry almost imme-

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diately. A thin dry crust is created on top of the work. As more solvents are evaporated from the under coats, they begin to shrink slightly in volume. The hard, outer crust can withstand this tendency of the under coats to shrink just so long; then the elastic limit is exceeded and the outer crust, on the crackle lacquer, breaks into irregular patches, thereby allowing the under coats to show through, and we have the familiar "crackle" effect.

To Control Crackle

The size and depth of the crackles can be controlled almost perfectly by regulating the amount of reducer used in crackle lacquer, the thickness or quantity applied to a given surface, and the speed with which the solvents evaporate from the crackle film, either by application of air or heat.

In general the more reducer used in the crackle lacquer, the smaller and more shallow will be the cracks. Likewise the wetter or more generous the material is applied to the work, the larger and deeper will be the cracks. The quicker the crackle lacquer is dried the smaller will be the cracks. By properly utilizing these three controlling factors, practically any size crackle desired can be produced.

After the coat of crackle lacquer has been applied for three or four hours, a coat of clear lacquer should be applied to bind down the pigment, to brighten the color, and to protect the crackle from wear. Flat lacquer or practically any other clear lacquer can be used for this purpose, or a coat of colored lacquer enamel can be applied instead of the clear lacquer if only the rough, cracked effect is wanted without the contrasting under coat showing through. By this last method some very good imitations of Spanish leather can be produced.

Points to Remember

The important points to remember in using crackle lacquer are:

(1) Use a lacquer undercoat under the crackle lacquer.

(2) Reduce the crackle lacquer as much as necessary to get good spraying and to secure the desired size of crackles.

(3) Keep the crackle lacquer stirred up while using it.

(4) Regulate the size of crackle by the amount of reduction, by the wetness of the application, and by blowing air onto the freshly coated work. Spray an even coat, if uniform size of crackle is desired.

(5) Apply a coat of flat lacquer, clear lacquer, or lacquer enamel over the crackle to protect it.

New Cleaning-Polishing Cloth

The Compound Specialty Co., Inc., Long Island City, N. Y., announce a new polishing cloth, called "Wondarag", for cleaning and polishing lacquered and varnished surfaces to a high luster.

Peaslee-Gaulbert Co. Strengthens Industrial Sales Force

Mr. C. T. Moore, formerly Sales Manager, Railroad Dept., Berry Brothers, Inc., of Detroit, Mich., is now representing Peaslee-Gaulbert Co., of Louisville, Ky., in northern Ohio and the Detroit district of Michigan, handling industrial sales of varnishes, enamels and pyroxylin lacquers. Mr. Moore is associated with Mr. H. B. Plummer, Industrial Sales Manager, Peaslee-Gaulbert Co., who was formerly Assistant Trade Sales Manager of Berry Brothers.

Mr. C. A. Stropaugh of Three Rivers, Mich., is now handling Industrial sales of varnishes, enamels and pyroxylin lacquers in the state of Michigan for Peaslee-Gaulbert Co. Mr. Stropaugh was formerly with Lansing Paint and Varnish Co., of Lansing, Mich.

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And ultimate consumer sales depend upon you, Mr. Manufacturer. Will it be ARMORLAC, the final furniture finish, that helps your customers make sales?

—That permanently beautiful finish achieved best with the ARMORLAC Lacquer System, which costs no more than varnish finishing . . .

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LACQUER SYSTEM
The Final Furniture Finish

Special Finishes to Match

Factory Superintendent of Leopold Desk Co. calls attention to problems and costs involved in custom finishing jobs, and lists some of the equipment and materials required for this work.

By Arley E. Jones

SPECIAL colors, shades and finishes are not only the cause of much trouble and grief to foremen finishers, but an item of expense not always figured high enough by the sales departments of furniture factories.

For example, Mrs. Ritzie has her dining room or sun parlor redecorated by Mr. Slopster, the painter, who uses a concoction of stains and colors never dreamed of by a furniture man. Mrs. Ritzie then orders her chauffeur to drive her down town where she expects to select a suite to match. After vainly trying all the stores, an accommodating clerk, says, "Mrs. Ritzie, bring us a sample of your room trim; we will send it to John Anderson Bros. Furniture Co. and have them finish Suite No. 4000 you like so well, to match." Thus trouble is born to some poor finisher.

Special Finishes Costly

Some manufacturers of furniture and kindred lines charge five, to fifteen percent more for special shades and finishes, or any charge from their standard. This may seem very high to the buyer, but if the loss of regular production, time spent by foremen, and hold-up of turnover because of keeping stock to fill these special orders in the white in a reasonable time—if all these factors are taken into consideration, 20 percent will just about cover the extra cost. Of course, if a large number of pieces are wanted the cost is spread.

If this sort of trade is catered to, then a regular system should be adopted, certain patterns always being kept in "the white," and stocks of color kept on hand.

System; Equipment; Materials

When an order comes in with the sample of finish, the foreman finisher should have all the information available. For this purpose a large envelope about 8x5-in., printed with some such form as shown herewith, having all information typed in the blank spaces, is very convenient. The envelope containing the sample of finish, formula, etc., can then be kept on file for reference.

Sample finish from.....
Their Order No.....
Our Order No.....
Pieces wanted.....
Finish.....
Formula to match this.....

Suggested information form.

Any first class finisher can become proficient in matching colors, but he should have material and tools to work with. A large scale for weighing fillers should be in every filler room; also a small scale, weighing down to one grain, and glass graduates and measures. Hot and cold water should be handy, and on the shelves should be not only the reg-

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New Haven . . . . 185 Church St.
Oakland . . . . . 319 Clay St.
San Francisco . . . . . 160 Seventh Street

ZAPON

The pioneer lacquer finish

ular stock colors but at least small amounts of all the items named below and any others that may be needed:

Bismarck brown, and nigrosine soluble in alcohol; also nigrosine, yellow, green and red, soluble in water; mahogany, brown and red, soluble in water, and walnut crystals. Lamp black, ivory black, rose pink, burnt sienna, raw sienna, burnt umber, raw umber, chrome green, chrome yellow, and vandyke brown in oil together with some natural filler.

All the above would mean but a small investment, and could be added to from time to time.

Some years ago the writer knew of a finisher being called to the office. The boss placed in his hands a panel and asked him if he could match it. He replied that he could, but said he wanted a couple of pounds of certain stain powder.

"Now don't make this cost too much," the boss warned, "get a little lamp black and darken your mahogany stain." (Said mahogany stain being water soluble.) He was invited to come up to the finishing room to "show us"; the finisher was from Michigan, and not from the state famous for its mules.

Pyroxylin Enamel for Bath Rooms

There are now on the market brushing lacquers which are suitable for use in finishing caen cement and plaster walls as well as woodwork in bath rooms. They are waterproof and very hard, tough and durable.

If the woodwork is new it is advisable to first put on two or three coats of a suitable white paint, primarily to fill the grain of the wood and stop any possible suction of the wood, so as to hold out the lacquer coats. One or two coats of a similar paint primer might also be applied profitably on the plaster walls to stop the suction.

Each paint coat should dry at least 24 hours before the next one is applied, and it is advisable to sand lightly between coats to remove any dirt nibs or other imperfections, and to build up a smooth surface. The paint coats should be so constructed as to withstand the solvent action of lacquers.

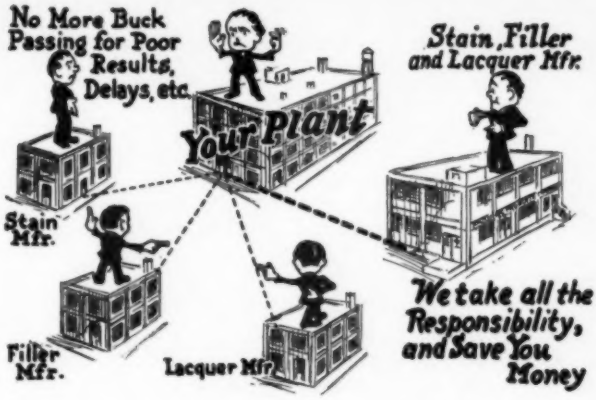
In case the spray system is to be used instead of the brushing system, the procedure would be approximately the same, except that any white lacquer made by a large number of lacquer manufacturers could be used. In such cases it should be reduced to the proper spraying consistency with a thinner furnished by the lacquer manufacturer, and possibly three or four coats applied over the paint undercoats mentioned above, allowing four or five hours between the various lacquer coats.—A. E. M.

One of the most interesting and practical uses of the bright and highly reflecting surface produced with aluminum paint is in the reduction of evaporation losses from oil storage tanks.

Lilly Varnish Co. Moves Into New Offices

The Lilly Varnish Co. will move the first week in July into a new office building just completed. Part of this building is devoted to light manufacture and part to offices, which will be quite modern in every way.

This is the second large building constructed at the plant in Indianapolis within the last year in addition to the building of a warehouse in Chicago during the same period.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Ask for a Demonstration

FINISHING PRODUCTS COMPANY

MANUFACTURERS OF
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INDIANAPOLIS

Fire Prevention Regulations

These corrected regulations and recommendations, with regard to spray finishing, were adopted at the 1926 meeting of the National Fire Protective Association held at Atlantic City, May 10 to 13.

By N. F. P. A.

THIS section refers to the application of paint, varnishes, lacquers and like finishes by spraying with an air brush or direct pressure, which presents a severe fire hazard. Complete ventilation is required to dispose of waste residues and vapors from the process, to avoid an atmosphere which, if not explosive, permits the rapid spread of fire, with the probability that practically all sprinklers in the room where spraying is conducted will open. Spraying processes also require specially designed equipment to minimize the collection of residues, which are particularly hazardous where pyroxylin lacquers are used.

Fire Causes

Fires in spray booths result from four principal causes: First, fans and motors used for venting the booth; second, broken electric lamps and other electrical defects; third, cleaning interior of booths, fans and motors with highly inflammable solvents; fourth, accumulation of deposits in the tubes and vent pipes, resulting from neglect to clean them frequently and from poor design.

Fires in this process are such as to demand a considerable amount of water to extinguish them and so the location of the process should not be over valuable contents, subject to water damage, unless the floor of the spraying room is waterproofed and provided with adequate scuppers or drains.

Spray Rooms

The process preferably should be located under smooth ceilings, as it is difficult to thoroughly protect open joist construction subject to such a severe fire. It may often be advisable to sheath such joist construction over spraying rooms with cement plaster on metal lath or equivalent approved construction.

Spray rooms should be separated from other values as far as possible by non-combustible partitions, but care should be taken not to make the spray room so small as to increase the liability to explosive mixtures of vapors and air. Booths preferably should be located sidewise to the walls so that natural light may be obtained and that fires may be more readily extinguished by projecting hose streams through windows. This is especially important in unsprinkled properties.

Spray Booths

Spray booths shall be constructed of metal with heavy metal frame. The use of wired glass panels in part is satisfactory. The booth should be as smooth as possible inside to promote cleanliness. If combustible, the floor within the booth and for an adequate distance outside should be protected with zinc or

"No one, so far as I know, was ever kept from using Murphy Varnish because it was not good enough for the job. Some have, no doubt, with a proper sense of proportion, sometimes realized that a job was not good enough for Murphy Varnish."

A *True* Story About Murphy Kauriol Wood Preparation

Our first advertisement on Murphy Kauriol Wood Preparation appeared in the February issue of this publication. It contained an offer to send a specialist to work with any manufacturer who would answer the advertisement to discover if the use of Murphy Kauriol Wood Preparation in his plant could reduce finishing costs and speed up production.

A large manufacturer in the Middle West took us up on this offer and we sent a man who spent three days with him in his finishing room. As a result a schedule was developed where Murphy Kauriol Wood Preparation, replacing other finishing materials, cut finishing operations from eleven to five, at the same time producing a finish of superior appearance. If durability tests which are now in progress work out as satisfactorily as *we* know they will, this manufacturer will adopt this material and effect an annual saving running into thousands of dollars.

Murphy Kauriol Wood Preparation is a combination stain, filler and waterproofing undercoating for lacquer. It is a lacquer itself. Because of its pyroxylin nature it makes an ideal undercoating for subsequent finishing coats of lacquer or wax.

Its adoption in your plant would probably save you money. We reiterate our offer to send a competent man to demonstrate this material to you and work out a finishing schedule employing it which will fit your individual needs.

Murphy
KAURIOL Wood Preparation

MURPHY VARNISH COMPANY
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other metal (preferably not steel, that sparks may be avoided). There should be a curtain not less than 2½ in. and not more than 5 in. deep along the outer and upper edge of all booths.

Booths, if of steel, should be kept thoroughly painted, or otherwise coated, especially the corners, to minimize the possibility of sparks. Booths shall be separated. A combination of two or more booths permits fire to communicate from one to the other, involving more than one booth in a fire; such an arrangement is not standard.

Where necessary, baffle plates shall be of removable type to facilitate cleaning. Baffle plates should be taken to a safe place for cleaning.

Exhaust Systems

Exhaust systems preferably should be indirect, the fans and source of power being located outside the booth and the exhaust pipe. If fans are inside, power shall be supplied by outside approved motors, air or water turbines, belts, or chain drives. If belts are used they shall be provided with a comb properly grounded to collect static electricity. Electric motors shall not be placed inside booths or exhaust pipes. Power for fans shall be arranged so as not to be interrupted by a fire in the spray booth, that the fans may be kept in operation during a fire to exhaust smoke and heat.

Rear view of spray booth, showing fan motors mounted outside on brackets above the discharge pipes—one way of keeping fan motors clean and accessible. Power is transmitted to fans with belts.

Exhaust systems shall be so designed as to maintain sufficient velocity and air circulation to adequately remove the vapors and to prevent all possibility of explosive mixtures forming in the room or the booth. Sufficient fresh air should enter the room to permit the fans to act efficiently and direct air currents toward the booths.

Each booth shall have an independent exhaust pipe. Pipes and stacks shall be provided with doors with strong fastenings, or otherwise be accessible for cleaning. They should be kept from contact with combustibles, being treated as chimney flues. Pipes shall terminate in a location where the discharge will not endanger property.

Where the building is so exposed that fire or sparks might enter the exhaust pipes setting fire to the spray equipment, the outlets shall be protected.

Where necessary, spray rooms should have ventilation in addition to the fans for the spray booths, this ventilation preferably should be by natural means through wall openings at the floor level, windows and roof vents. If fans are used for ventilating the room, the system shall be in accordance with the regulations for blower systems.

Fans shall have rigid brass,

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Tough	Time Saver
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No. 4 Spraying Lacquer

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We also make a complete line of Rubbing and Polishing Varnishes—Flat Varnishes—Gloss Coaches—First Coaters—Enamels and Orange and White Shellac.

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Columbus, Ohio

bronze, or aluminum blades with ample clearance to avoid creating fire by sparks or friction, necessary allowance being made for ordinary expansion and loading to prevent contact between moving parts and the tube; or if blades are of steel they shall be surrounded by a brass or other non-spark producing ring.

Fan motors shall be of a type approved for hazardous locations. Fans shall be mounted on a shaft sufficiently heavy to maintain perfect alignment even when the blades of the fan are carrying heavy loads of paint, the shaft preferably to have bearings outside the tube and booth. All bearings should be of the self-oiling type.

Electric Equipment

All electric apparatus shall be in strict accordance with the National Electrical Code governing such apparatus in hazardous places. Only incandescent or mercury vapor lamps shall be used for lighting. Lamps shall be protected by vapor-proof globes or shall be double glazed; no spark-producing cutouts, switches, detachable plugs, or portable lamps shall be used.

General Rules

Solvents, paints, lacquers and such flammables shall be stored and handled in strict accordance with the Regulations for Containers for Hazardous Liquids so far as they apply and the main supply shall be kept outside the building.

Containers supplying spray nozzles shall be of closed type or provided with tight fitting metal covers kept in place. Tanks not resting on the floor shall be supported on metal brackets or suspended by wire cables. Gravity tanks shall not exceed 10 gallons. If an original container is used directly at the booth, it should be mounted on strong brackets which will hold it securely in place, while in use. Air pressure, if used on original containers, shall not exceed 10 pounds, a relief valve being provided on the tank attachment for this purpose. Empty drums and other empty containers shall be promptly removed from spray room.

Piping shall be strongly erected and rigidly supported. Valves shall be provided in pipes where flexible hose is taken off and these shall be kept closed when hose is not in use.

If a spray liquid heater is used, it preferably should be steam. If electric, it should be of approved design and arranged to prevent the attainment of a dangerous temperature.

Protection

Each booth shall be equipped with one or more approved automatic sprinklers, which may be supplied from the regular sprinkler system, when available, or, in unsprinklered rooms, from the nearest convenient adequate water supply pipe. Sprinklers should be located within the booth at the top, not nearer than 4 ins. from the outer edge, so that it will not get covered with paint and can protect some of the area outside of the booth. It should be kept clean. A curtain not less than 2½ ins. nor more than 5 ins. deep shall be installed along the upper outer edge of the booth to serve as a deflector to confine most of the discharge in the booth and retain heat.

Vent tubes and stacks, unless very short or small, shall be

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equipped with one or more approved automatic sprinklers so located that the entire interior of the tube will be protected. Booths of unusual design, shape, size or hazard require specially planned sprinkler protection.

Automatic sprinklers within booths, vent tubes, and stacks shall be controlled by one or more approved valves located in a readily accessible place not seriously exposed to a fire in the booth.

Foam type extinguishers are particularly effective to protect open containers of flammable liquids. For the general protection of spray booths and their exhaust systems, particularly where pyroxylin lacquers are used a standard equipment of small hose or of soda acid extinguishers should be installed. Where the spraying hazard is extensive or severe, a 40-gal. chemical engine should be provided.

Maintenance

Spray booths, tubes, stacks and all other apparatus shall be kept as free from deposits as practicable by cleaning daily and oftener if necessary. For cleaning purposes, only non-sparking implements are permissible. Where used, metal spuds or hoes should be made of non-ferrous metal.

Where pyroxylin lacquers are used, all surfaces of booths and tubes where dust accumulates shall be thoroughly wet before starting cleaning operations.

The dried residue which collects in spray booths and tubes, where pyroxylin lacquers are used, is highly flammable, and once ignited the resulting fire spreads rapidly. The degree of this hazard largely depends upon the design and manner of installation of the system, operating methods, and quality of housekeeping.

Employes must not be allowed to enter stacks or tubes for cleaning until the stack or tubes are entirely free from flammable vapors and are thoroughly wet down for their entire length.

Cleaning interiors of spray booths may be aided by applying a heavy coating of plaster of Paris or whiting, by covering the walls and roof with a heavy coating of vaseline or cup grease over which is usually applied heavy manila paper, or by blowing down daily with compressed air while the ventilating system is operating. No highly flammable solvents should be used for cleaning. If naphtha or benzine be diluted with about 60 per cent of carbon tetrachloride they may be used, as the danger is thereby reduced; kerosene may also be used. Scrapings should be placed in covered metal receptacles and immediately disposed of.

Spray booths used in connection with the application of pyroxylin finishes shall be used for no other purpose. If this caution is not observed, serious results are probable, for the reason that alternating deposits of pyroxylin materials with varnish, oil base stains, ground coats, etc., make probable spontaneous heating and eventual ignition.

The amount of stock in spraying rooms shall be minimized to avoid unnecessary loss, care being taken to keep stock, especially that which has just been coated, well removed from the booth.

Air lines should be blown out occasionally to remove any possible accumulation of foreign matter.

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Piano Finish Checking

A problem of checked varnish is presented and an analysis of possible and probable causes given by expert authority on finish materials and their uses.

By R. L. Masterson

A PROMINENT piano manufacturer recently submitted a novel problem to us which we feel is of sufficient general interest to publish, because the analysis of this problem applies to all varnished furniture as well as to pianos. A piano was finished in 1922 according to the following schedule:

One coat of water stain—dried one day.

One coat of silex filler—dried four days.

Four coats of polishing varnish—dried one week between each coat, except the fourth coat which was dried two weeks.

Coarse rubbed.

Flowed with one coat of same polishing varnish as used on the four building-up coats—dried two weeks.

Fine rubbed and polished.

All coats were dried at an even room temperature of about 75-degs. F. and no force drying was used on any of the coats. The piano was shipped from the factory in Pennsylvania, Oct. 7, 1922, and shortly thereafter was placed in a home in Eastern Tennessee.

This home is on an upland farm with no creeks near and ten miles from the nearest river. The elevation is about 1100-ft. above sea level. The house is a one-story bungalow of frame construction with a small cellar under only a portion of the floor.

The piano was placed in the northeast corner of this home against outside walls, both of which are unprotected by porches or other rooms. Across the room from the piano is an open grate which is heated with bituminous coal only occasionally. In other words, the room is not heated at all times, but only upon occasion; the remainder of the time the room temperature is approximately the same as that of the outside atmosphere.

Nature of Checking

The finish on the piano is badly crazed or checked on practically every part that was exposed to the atmosphere, on solid wood mouldings as well as on veneered panels. It is apparent that the piano was not exposed to dampness as the metal work is perfectly bright and clean without any traces of rust.

A peculiar fact is that the underside of the top lid, where it was exposed to the atmosphere, is very badly crazed; but as you go back into the interior of the piano the crazing becomes less and less, until at the back edge the finish is in very good condition. The same condition applies on the fall board, or the part that covers the keys. This piano was evidently left open, because the face of the fall board is badly crazed but the back of this part, which was on the inside of the piano and not exposed, is in perfect condition.

The foregoing describes briefly the conditions at the time of finishing the piano and the time of

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Number 127 Oil Lacquer

Use Number 127 Oil Lacquer and you sure will speed up your finishing work. Goods will always be ready for rubbing by next morning. If you don't rub, you can pack 'em the next day and never fear their printing. And Number 127 is for EVERY lacquer job.

Half the cost of ordinary clear lacquer yet with twice the covering capacity!

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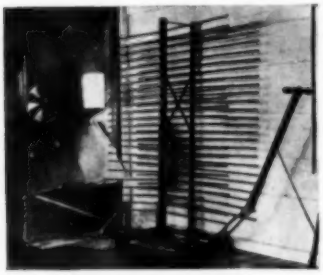
FILLERS STAINS POLISHING WAXES

year it was shipped; also the location, type of construction and other conditions in the home in which it was placed, the location of the piano in this home, the method of heating and the ultimate condition of the finish on the piano. The question is, "what caused the varnish to check as it did?"

In cases such as this there is usually no definite way to prove the exact cause of the trouble, for there are usually several sets of conditions that might have caused it. All that can be done is to set up the causes which through experience are known to result in a similar effect and then see if the conditions in the case in question are similar to those that have caused trouble in the past.

A Common Cause

Probably the most frequent cause of checking or cracking of finish lies in the undercoats being softer or more elastic than the top coats. All paint and varnish materials dry by a combination of evaporation of the volatile solvent portions, and oxidation of the non-volatile oils and gums. Within a short time after application a large portion of the volatile thinners evaporate and the varnish takes on a tacky or a stiff sticky feeling. From this point the drying proceeds through absorption of oxygen from the air which converts the oils and dissolved gums from a liquid to a solid form.



Portable rack made entirely of iron and steel. The brackets are slender strips of angle iron and they are placed close together, as the rack is only intended for holding small flat pieces.

This oxidation usually takes place more rapidly on the top portion of the film, which is exposed to the atmosphere where it can most readily absorb the oxygen. Within a few hours this top film will be hardened and yet the varnish will be more or less soft underneath, where it is not as yet thoroughly oxidized.

If another coat is applied before this film is thoroughly hardened, the new coat will begin to harden from the top down and will soon form a layer which retards the oxygen in getting to the bottom of the first coat of only partially-dried material. If the last coat stands long enough it will harden through and through and yet the bottom portion of the first coat may not be thoroughly dried.

Expansion—Contraction

If the finish is subjected to a change in temperature at this time there will be an expansion or contraction of the wood and the finish. Now the portion of the finish that is not thoroughly dried will expand or contract over a greater distance, with a given change in temperature, than will the hardened top film. As a result the elastic limit of the top film may be exceeded and checks or cracks will appear.

Regardless of whether any great changes in temperature take place there is danger of checking under the above mentioned conditions, due solely to the fact that as the undried por-

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Is the finish to blame?

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Paints, Enamels, Lacquers
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The du Pont Industrial Finishing Service, backed by years of scientific training and research, is particularly competent to solve finishing problems in the brass and metal industries. Write on your letterhead to E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Chicago, Ill., San Francisco, Cal., Everett, Mass., or Flint Paint and Varnish Limited, Toronto, Canada.

DU PONT

tion of the film finally becomes dry it will shrink in volume; since the top film is dry and already under a strain, similar to that of a rubber band drawn tightly over a wooden surface, it may not be elastic enough to change shape with the underneath portion and will be broken in pieces as the underneath portion shrinks in volume.

Any condition which causes a portion of the under coats to be softer or more elastic than the top coats, usually results in checking or crazing. Improperly dried coats will do it as mentioned above. If the coats are heavier in some spots than others much the same effect will be produced in those same spots. Or if the top coat of varnish contains less oil or is "shorter in oil" or less elastic than the bottom coats, exactly the same condition exists. The elastic material will expand or contract over a greater distance than the less elastic material, and as a result the top film will be broken or checked.

In the present case of the piano in Tennessee, it appears that the checking is not due to any of these causes. The same varnish was used for all coats and each coat was allowed sufficient time to dry. We will have to look elsewhere for the cause of the trouble in this particular case.

Condition of Veneer

Improperly dried veneer may contract sufficiently after being coated, due to a change in moisture content and consequently a change in relative volume, to disrupt the finish and cause severe cracking. Likewise, unprotected edges may absorb enough moisture during the rubbing process to cause checking, or the wood may take on moisture from damp cellars or other sources through unprotected edges of the wood after the finished article is in the home.

Neither of these causes seem applicable to this particular case for we assume that the veneer was properly dried before being finished. If the crazing were due to moisture being absorbed through unprotected edges it would extend only a short distance back from each edge, and the center of the panels would be in good condition. In this case, however, the crazing is general over the whole surface and is no worse near the edges of the panels than in the center. Also the investigation shows there are no damp cellars, creeks or rivers near the home in which the piano stood.

Home Cleaning; Polishing

Another condition, which might cause checking, is the use of an improper polish or cleaning compound. This might cause a softening of the film or might rob the finish of its elasticity and cause checking. No definite information as regards the cleaning or polishing methods used in the home are available in this particular case, so we can only say that this might be one cause, although we are more inclined to feel that the cause lies in the set of conditions mentioned in the next few paragraphs.

Regardless of how good the varnish may be or how carefully it is applied and dried, hair lines are often caused by sudden extreme changes in temperature. The outer film of the varnish becomes cold first and consequently becomes less elastic. As the bottom portion of the film becomes cold it also shrinks in volume and may cause the varnish to craze,

Vitraloid Wood Lacquer No. 2546

A NEW cellulose lacquer—a quality product developed by the Pratt & Lambert Laboratories for use by furniture manufacturers in securing any wood finishing effect.

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PRATT & LAMBERT - INC.

Manufacturers of

Varnishes Enamels Lacquers

84 Tonawanda St., Buffalo, N. Y.

New York Buffalo Chicago San Francisco
Bridgeburg, Ontario

If the changes of temperature are sufficiently severe, or if they are repeated frequently enough, the hair lines may develop into checks or cracks.

Changes in Temperature

That is the reason why a varnished article, such as a piano, should be carefully protected with a cotton flannel cover, newspapers, or some such material during shipment in cold weather. The finished article should be moved gradually from one temperature to another; that is, it should not be subjected to any extreme change in temperature in a short space of time. Care should be taken in transferring the finished product from a warm factory or warehouse to a cold shipping platform or box car. Equal care should be taken in bringing the article into a warm room from a cold atmosphere, to prevent condensation of moisture on the cold surfaces.

Since the piano in this case was shipped from the factory in October, it is evident that the cracking is not due to negligence on the part of the manufacturer in loading the piano immediately from a warm factory into a cold box car. Presumably the piano dealer who delivered the piano to the home also took proper precautions not to subject the piano to extreme or sudden changes in temperature.

In our opinion the most likely cause of the checking was repeated changes in temperature in the room of the home in which the piano stood. It will be remembered that the piano stood against the north and east, unprotected, outside walls of the frame building where, during cold weather, the piano would become quite cold while there was no fire in the grate. A fire was burned in the grate occasionally and at these times the room and the piano probably became quite warm. When the fire went out in the grate the room became cold again and likewise the piano.

How Checking Progresses

The first time this change of temperature took place there was probably no visible ill effects. After a few repetitions, however, hair lines probably formed in the finish while the piano was cold and apparently disappeared when it was warmed up again. In reality they were still present, and became larger and more visible as time went on, finally developing into visible cracks and checks after several repeated changes in temperature.

That this is the probable cause of the failure of the finish is further strengthened by the fact that those parts of the piano which were on the inside did not check and crack, due to the fact that their protected position allowed them to warm up and cool down more gradually than the outside exposed parts.

All of this is an analysis based upon careful consideration of the facts as given to us and by an examination of a portion of the piano which was sent to us. There may be other conditions that would cause this crazing and checking, but it seems that the most probable ones are either in the use of an improper polish or in the sudden and repeated changes of temperature in the home.

The use of lacquer and pyroxylin enamels continues to increase.

The time element is a big factor in all kinds of finishing today.

The ROCKFORD VARNISH Company

FOR twenty years the Rockford Varnish Company have been specialists in manufacturing fine finishes for cabinet work. That's long enough to thoroughly learn the intricacies of the manufacture of high grade finishes, but not long enough to lose the pioneering spirit that always seeks a better way of making a better product.

Rockford Varnish Company finishes bear a splendid reputation—built by time and quality. We'll be glad to prove that they will exactly meet your requirements.

Write for complete information in regard to any of your finishing problems.

ROCKFORD, ILL.

Finishing Die-Cast Parts

Die-cast parts—made generally of alloys of low fusing points—present peculiar problems as to being cleaned for finish, and as to the application and drying of finishes most suitable for them.

By C. W. Hawkinson

A DIE CASTING may be a casting, formed in a metallic mould or die, from various metals or mixtures of metals which are subjected to pressure, either gaseous or mechanical, while the metal is still in the molten state. Because the metal is in liquid form, the pressure is practically uniform in all directions and it is therefore possible to form castings by this process that are much more intricate in design and more exact as to precision of measurement than by the "sand casting" or "drop forging" methods.

This process of forming castings possesses still a further advantage in that an extremely smooth surface is obtained on the casting, due to the smoothness of the metallic mould and to the fact that the molten metal is almost instantly cooled and hardened when it comes in contact with the comparatively cold surfaces of the mould.

Modern die castings are comparatively new, being first applied about twenty-five years ago to interchangeable parts on cash registers, phonographs and similar machines. Aluminum die castings made their first appearance about twelve years ago, as a result of intensive work in developing bearings and other parts for automobiles. Today, it is said that approximately 75 percent of all the die castings made are for the automobile industry where they are used as parts for speedometers, magnetos, oil pumps, body hardware, lighting systems, etc.

Problem of Finishing

While die castings are very useful and are filling a long felt want, the finishing of them is quite a difficult task, especially if the baking process is used, because of the difficulty of making the finish adhere or stick tightly to the work. This is due partly to the composition of the alloys used, and partly to the hard smooth surface, in addition to any oil or grease that may be present from handling or machining operations.

Chief Alloys Used

Alloys of comparatively low fusing points are generally used in producing die castings, and this increases the difficulties of finishing where the baking process is used. There are four main groups of alloys used:

(1) Tin-base alloys, containing 60 to 80 percent tin, 2 to 7 percent copper, 3 to 7 percent antimony and sometimes a small percentage of lead.

(2) Lead-base alloys, containing 80 to 96 percent lead, 4 to 20 percent antimony and sometimes as high as 10 percent of tin.

(3) Zinc-base alloys, containing 88 to 95 percent zinc and small amounts of tin and copper or aluminum and copper.

Wood Grain Reproduction

Many of the leading furniture manufacturers are exhibiting samples of their products at both the Grand Rapids and Chicago Markets grained with equipment furnished by

The Vance Mfg. Co.
DAYTON, OHIO
Manufacturers of Equipment for the Reproduction of Wood Grain and Marble

Process Fully Protected by Patents in the U. S. and Foreign Countries

(4) Aluminum-base alloys, containing about 90 percent of aluminum alloyed with small percentages of copper, nickel and silicon.

It will be observed that all four of these groups of alloys contain large quantities of metals which within themselves are hard to finish. For example, it is often difficult to get a finish to adhere to zinc, lead or aluminum, not only because of the extremely smooth surface these metals usually present, but also because of the inherent greasy feel which all of these metals have.

The finishing difficulty is increased due to the fact that in the process of die casting, small quantities of air or other gases are often entrapped in the metal, and if the die castings are baked this air or other gas is often driven out of the metal and forms small pimples or blisters on the surface of the finishing material.

Clean the Surface

The first step to take in finishing die castings, either with baking or air drying materials, is to see that the surface is thoroughly clean of oil and grease which is usually present, due to handling and machining operations. Undoubtedly the best method of cleaning is by the sandblast, as this not only removes the grease and oil but also leaves a slightly roughened surface to which the finishing material will adhere better than to the smooth surface.

Many people merely wash off the castings with naphtha and then dry them with clean cloths. If this method is used care must be taken to change the naphtha frequently to prevent the concentration of oil or grease becoming so great as to deposit a thin film on the work. Also, the wiping cloths must be discarded as soon as they begin to show any trace of oil or grease.

Caustic Solutions

If proper care is taken, a weak caustic solution can be used to advantage for cleaning die castings, since the caustic not only will dissolve the grease and oil but will also attack the metal slightly and give an etched surface to which the finishing material will adhere better. Care should be taken, however, to leave the castings in such a caustic bath for only a few seconds as the caustic will quickly dissolve aluminum, zinc and some of the other metals used.

The parts should come out of the bath with a bright appearance. If they show a tarnished surface this indicates that they have been immersed too long, which will often cause pitting of the metal. The solution should be kept at a temperature of about 160 degrees F. to prevent it from penetrating into the pores of the metal.

Once the castings are thoroughly clean there is no further preliminary work to be done, if an air drying finish is used. It should be noted, however, that many finishers of die castings have apparently found that the duller-drying finishing materials, containing considerable pigment, seem to give better results than the more glossy ones.

Heat Before Finishing

If the finish is to be baked, another precaution should be taken following the cleaning operation and before the finish is applied. Because of the air and other gases entrapped in the pores of the metal, it is advisable to first heat the castings to a temperature at least 15 or 25 degrees higher than

that at which the finishing material is to be baked, and hold this temperature for a period of 30 minutes to an hour. This preheating evaporates any small quantities of grease or oil left on the castings, and also causes any small particles of gas or air contained in the metal to expand and break through the surface.

If any small pimples or pin heads appear on the surface as a result of this treatment, they can easily be sanded off. If this preliminary treatment is not given, the baking on of the finishing material will expand this entrapped air and cause it to leave small pimples on the surface. However, if the castings are given the first coat as soon as they are cool after this preliminary heating, and then baked at a temperature which is slightly lower than that at which the bare casting was heated, there will be little difficulty experienced.

Baking Temperatures

Different die castings will withstand different baking conditions according to the composition of the alloy undercoat. Die castings made on a base of tin, lead or zinc should usually not be heated higher than 250 degrees F., otherwise tin, which has a low melting point, may sweat out of the casting and cause trouble. Die castings which contain no tin can be baked at somewhat higher temperatures, but even here care must be taken not to go too high, or the casting will crystallize and become brittle.

The temperature at which the finishing material is baked should always be slightly lower than the preheating temperature. Some die castings can be baked as high as 350 degrees F., while others will not stand more than 224 degrees F. A few tests on the particular die casting to be finished will indicate the maximum safe temperature.

Composition of Finish

In conclusion it seems advisable to say that the composition of the priming coat has a great bearing upon the final results. In view of the good results secured on zinc and aluminum, with certain red metal primers containing considerable iron oxide in combination with suitable oils and varnishes, it would seem that this is the logical type of primer to use. In fact, many people now finishing die castings satisfactorily are doing just this thing with apparently good results.

Peerless Enters Canada

The Peerless Pneumatic Systems, Inc., announces that in order to look after the Canadian business, they have opened an office at 101 McKinnon Bldg., Toronto, Ont. This office will be in charge of Mr. Wilfred H. Harrison, Jr., who has had a great deal of experience in the handling of spraying equipment. Complete stocks of equipment and parts are now carried in Toronto and Montreal.

No. 82 WATER WHITE LACQUER

For GOLD A finish to depend upon.
For SILVER An economic lacquer made
For BRASS by pioneer lacquer makers.
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Industrial Finishing

PRACTICAL PUBLICATIONS, Inc.
Publishers
Room 603, 222 E. Ohio St.
Indianapolis, Ind.

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

JULY, 1926

The Furniture Shows

As this issue of INDUSTRIAL FINISHING goes to press manufacturers of furniture have their newest creations on exhibition at the mid-summer shows for the inspection of buyers from all parts of the country. At the Chicago and Grand Rapids markets there is so much of beauty on display that buyers will require some time to decide just what suites and odd pieces they should select, and in what quantities they can safely order.

New designs and revised color schemes include strong highlighting on dark walnut with further enrichment by the use of insets, bands and overlays in rare colorful woods finished natural, and by the use of floral and landscape decorations done in both subdued and brilliant colors. Then there are a few suites and odd pieces in that always staple and beautiful wood, mahogany. Much furniture today is attractively done all in color with added ornamentation produced by shading or "smoking," as well as the striping, two-toning and hand-painted or decalcomania decorations which give added life and snap to the general color scheme.

Pausing a moment to contemplate all this wealth of beauty and color, one cannot fail to be impressed with the all embracing part that finishes play in such a gorgeous show. The care, skill and patience of every member of the finishing crew is in a measure responsible, and back of their efforts are the finishing materials and the finish applying, conditioning, rubbing and polishing equipment and supplies, all developed at much expense of time, effort and patience, and finally demonstrated to the user's satisfaction by experienced field men. These are contributing factors that make furniture shows the attractive, interesting and educational exhibits they are today.

An increasing responsibility rests upon all who have anything to do with the manufacture, development, sale, selection, demonstration or use of finishes or finishing supplies and equipment. It is therefore important to continually exchange ideas and keep well informed on everything along this line.

The Surface and Undercoats

In the paint shops and finishing departments of industry, reminders are constantly appearing to emphasize the importance—yes, the necessity of conditioning the surface properly to start with and then putting on exactly the right kind of primers, fillers, stains, sealers, surfacers or whatever undercoats are required to present suitable foundations for the final finishing coats.

The foundation prepared for a durable and presentable paint or finish job is more important relatively than the foundation of a building. If a building foundation is unsatisfactory it is within the possibilities of modern engineering to completely replace it with a good foundation without tearing down the building. Not so with a built-up finish.

If the finish foundation is at fault there is no alternative but to remove all the finish down to

the bare wood or metal, and do the job all over again; that's expensive. You must have the proper foundation before you can obtain a satisfactory finish.

Metal Furniture Exported

According to the U. S. Department of Commerce Reports for May 24, the American manufacturer and exporter of metal furniture may well be encouraged by the progress which his product is making in the world markets. Sales of American metal furniture in all sections of the world have shown a steady increase during the past three years, and appear to be continuing this increase in the present year. Figures for the first quarter show an 8 per cent increase, as compared with the average for 1925.

Incidentally this supplies a volume outlet for increasingly large quantities of American finishes, which are used on metal furniture protectively and decoratively.

Foremanship

Evidence reveals the fact that there is plenty of room today for improvement in finishing room and paint-shop foremanship. Part of the improvement must come from foremen themselves and part of it—a very large part—must come from management. Finisher foremen must have recognition, encouragement and cooperation.

The manager or superintendent of production will do well to keep in close touch with his finishing foreman, and obtain more accurate knowledge of his problems and his ideals. The foreman finisher is one of management's most important factory representatives, as his department puts more sales appeal into the concern's goods than all other production departments combined.

The foreman worth while is the one who has a spirit of interest, progressiveness, and enthusiasm, but without the co-operation of management this sort of man may be the hardest kind to keep. Such an individual will refuse to continue long in a rut and he will not work indefinitely under unreasonable handicaps. An able and progressive foreman can suggest many improvements which in the end will prove economical, satisfactory and permanent. Industry needs more foremen of this caliber, and concerns who are so fortunate as to have them should solicit their suggestions and give them a voice in the selection of all finishing materials and equipment.

Rust, once started, will spread under a paint or lacquer coating.

There is advertising value to a a good job of finishing.

The final rubbing on top.

Uniforming Stains

Foreman Finisher explains how to prepare and apply stains for making maple table legs match, in tone of color, walnut veneered tops

By W. J. Harwell

IN a recent issue of INDUSTRIAL FINISHING a correspondent asks for a walnut water stain that can be sprayed on maple table legs to match walnut veneer used on the table tops. I am taking it for granted that the veneer is not bleached nor finished natural, but that it is stained along with the maple legs. I also assume that the inquirer understands it is impossible to stain maple to "match" walnut veneer, and that the best he can hope to do is to make them the same color so they will harmonize in general tone, without giving the one the characteristic markings of the other.

Double Strength Stain

Under these conditions we might say that no special formula is required for making a water stain for maple to match walnut veneer, except that the stain required for the maple must be double the strength of that used on the walnut veneer. If the stain can not be made double strength safely, then an additional coat should be applied.

The reason I say "safely," is because there is a limit to the amount of stain powder that water will dissolve. If the stain used on the veneer is very dark, it might be unsafe to try making that for the legs double strength.

Any of the walnut stain powders supplied by advertisers in this journal will answer your purpose, if they are the right shade. I suggest you inquire of the manufacturer what is the limit of stain that can be used in a gallon of water. That information will save you the necessity of doing any experimenting if you are making your finish dark.

You may use walnut crystals instead of one of the specially prepared walnut stains, if this will give you the shade of walnut you desire. The same stain may be used on the veneer as is used on the maple legs, provided you stain the maple first, and wipe the stain off the veneer almost immediately after it is applied.

Shellac Water Stain

Regarding the formula for shellac water stain: This stain is made in two operations. The stain is first prepared, then the shellac, and the two are mixed together. The stain is first made double strength—that is, if a certain amount of stain powder to a gallon of water will give the desired depth of color, it will be necessary to use double that amount of stain powder for the first mixture, since the second solution (which is the shellac solution) will reduce it to the desired shade.

Another thing to remember is that only water-soluble stain powders can be used for this purpose. It is my experience that stain powders which are soluble in both water and spirits will not prove successful.

BREVOKRAK is a complete lacquer process which produces unique effects commonly known as "krakle."

A WIDE RANGE of beautiful color combinations give the appearance of either antique or leatherette finishes which are now in vogue.

APPLICATION BY air spray and very rapid air drying are factors that make possible a hastened movement of your product through the finishing department.

WHY BREVOKRAK?—rather than any other "krakle"? Brevokrak is not only a "krakle" material, but is a "krakle" system. Included are the proper equipment, complete instructions or demonstration in your plant as desired, and initiation of your workmen into the proper application of this Brevokrak system. This Brevokrak system—which is recognized as a standard—guarantees a uniform pattern at the minimum cost.

TO ESTABLISH THE VALUE of this finish for your line we shall gladly finish samples for you at Waukegan or make a complete demonstration at your plant.

(*BREVOLITE* Wood lacquers and lacquer enamels meet the demand of the wood finishing trade for filling qualities and durability—samples on request.)

Waukegan Chemical Company

"Values that endure"

WAUKEGAN :: ILLINOIS

Mix Carefully

The first thing to do in making a shellac water stain is to dissolve double the usual amount of stain powder in the usual amount of hot water—water at a temperature of about 175 degs. F. It should not be used at the boiling point. Put the powder in the vessel and pour the water on the powder, stirring all the while and continuing until the powder is thoroughly dissolved.

Then in another vessel have the same amount of water as was used for the stain, only this water should be heated to a temperature of 150 degs. F. In this water dissolve dried carbonate of soda in the proportion of 60 grains to 1 gal. of the water, and stir until the soda is all dissolved. Pour into it slowly bone-dry, bleached shellac, in the proportion of ½ lb. to 1 gal. of water, and stir until the shellac is completely dissolved.

Carbonate of Soda

In making this carbonate of soda solution the finisher must be certain that he has the right kind of material. I suggest that carbonate of soda be purchased from a wood-finishing supply house, and that they are told what it is to be used for, so there will be no mistake. Some people have tried to get this from a drug store and have received bi-carbonate of soda, which is an entirely different thing; others have been given sal-soda. Ask for *dried carbonate of soda*, and make sure you get it.

Another precaution: Make sure that the shellac is fresh—not old and lumpy. Lumpy bleached shellac is usually the result of the shellac having been bleached a long time, or having been exposed to dampness; either condition affects its solubility.

In preparing the soda-shellac solution, one must be very careful and use the exact proportions of carbonate of soda and shellac; if too much carbonate of soda is used it will completely spoil the stain. This formula has been worked out very carefully, and the proportions of "60 grains of carbonate of soda to one-half pound of shellac" must be adhered to rigidly.

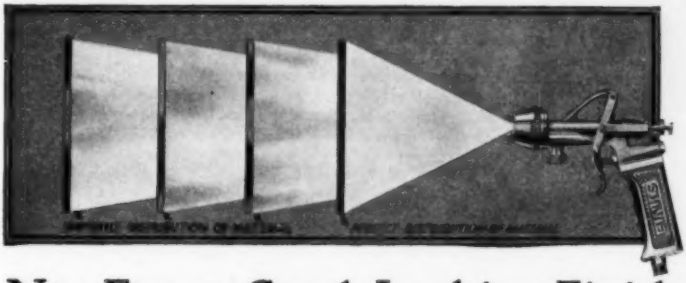
If carbonate of soda is put in the stain without the shellac it will cause the stain powder to separate from the water and settle. It is the carbonate of soda that eats, or dissolves the shellac.

If there is more carbonate of soda than is required to eat or dissolve the shellac, it will then begin to affect the stain powder: but if its strength has been all spent on the shellac, it is rendered harmless, or as we say, "neutral." A little too much shellac would not do so much harm, because if there is more shellac than can be dissolved by the carbonate of soda, it can be removed by straining.

After the stain solution and soda-shellac solution have been made, as per the foregoing directions, they should be strained to remove any foreign matter; they are then ready for mixing together. These materials may be applied either with a brush or spray gun.

Spray Equipment Bulletin

Peerless Pneumatic Systems, Inc. announce as being ready for distribution, their new bulletin No. 28 covering spray equipment for furniture and allied industries. This eight page bulletin is very complete, and includes several attractive cuts of the newly developed Peerless Vertical Exhaust System for spray booths.



Not Every Good-Looking Finish is a Good Finish

A smooth, even finish in the application of varnishes or lacquers is a prime consideration. But perfection requires more than that. Unless the material mixture is uniformly distributed across the entire area of the spray, imperfections are purely natural, weak spots result.

How Weak Spots Develop

When the distribution of solvents is not uniform, adhesion varies, weak points in the spray leave weak spots on the finished surface. These weak spots, whether detected or not, always endanger come-backs.

In a perfect spray coat, all solvents are evenly distributed, permitting fine particles of the essential ingredients to knit together uniformly and become more binding. A weak point is equivalent to the absence of one or more essential ingredients in the material. The graphic sketch above is slightly exaggerated to illustrate this point.

Evaporation of Low Boiling Solvents Weaken Material When Applied

Proper distribution of every solvent in the material requires more than perfect atomization. Even perfect atomization may lose important solvents by evaporation at the end of the spray.

The operator cannot work closer to the surface than the point of atomization in the spray will permit. And the longer the spray, the greater the evaporation.

What Tests Have Proved

Tests made by Binks engineers in collaboration with material manufacturers have proved conclusively that the Binks Spray Gun positively overcomes that hidden fault in finishing. Here the atomization takes place at the immediate outlet of the nozzle, permitting the operator to work closely to the surface. Material is deposited with a uniform consistency,—every particle of essential solvents are applied intact, there is no evaporation.

The Binks system of application is worthy of your consideration regardless of the type of equipment you are now using. Improvement in finishing and saving of labor and materials, makes Binks Spraying Equipment a worthwhile investment. A request for full details implies no obligation.

BINKS SPRAY EQUIPMENT CO.

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Offices in Principal Cities

Modern Car Refinishing

A practical and experienced painter-finisher who is instructor of painting at Hampton (Va.) Normal Institute, comments on an article in May issue of I. F. and recommends use of more modern materials and methods.

By A. F. Eibell

AN ARTICLE on "Automobile Refinishing" by R. J. Birnel in May issue, page 9, reminds me of the carriage painting days long ago, and without going too deeply into the subject, I would suggest that the time he has consumed in his struggle from paint removing to ground coat (using his own figures) is about all the time that's required to do a job these days from metal up to delivery in a standard varnish process; and as for lacquer, it's supposed to be even quicker. In this I don't mean a shoe-shine job either, but one that's full and round and can be guaranteed to look and wear with the best.

Improved Body Cleaning

As for the stripping or removing of paint, with the exception of the reference to cleaning the corners, his method will do, but a live one will take a steel brush of the proper kind and some steel wool, and clean off surface, corners, checks, etc., as he goes. Then, with high-test gas, alcohol, or turpentine he will wash the job down, drying it off as he goes and the job is ready for the primer.

Now, most any of the firms that make a specialty of materials for automobile painting, will furnish a metal primer that will both prime and fill. Unless it's a car of rather ancient vintage it will not need any "plastering," for there will be no file marks, but if such is the case any of the sanding surfacers will do to glaze with, just as the material comes from the can.

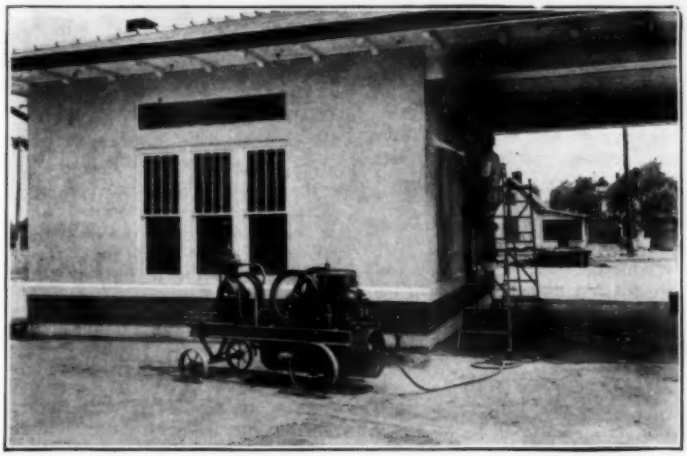
A Faster Schedule

These same sanding surfacers will take the place of that abominable compound called "rough-stuff," so that by the third morning the job should be cleaned, primed, puttied, filled and dry, ready to rub out. On the third day the surface can be rubbed and the ground coat and color varnish applied. On the fourth day the color varnish is "flattened," the striping is done and clear rubbing varnish is applied. The fifth day the work is rubbed, cleaned up and "flowed;" the sixth day the car is assembled and delivered.

According to our friend Birnel he would perhaps have gotten to his ground coat. Even in the days of carriages, lead and rough-stuff, whoever heard of a 90-percent oil ground coat for a varnish finish? As he does not give the vehicle in which he mixes his silex or silica for his rough-stuff, one can't judge how much of this oil ground coat it might absorb, but one thing is sure: nothing short of chalk would lap up enough of this 90-percent oily coat to produce a surface that a modern automobile rubbing varnish could stick to, to say nothing of anything else it might do.

Modern Materials Available

Today we can get, from any one of a dozen or more firms, primers that will prime and fill as well, and dry in from 3 to 12



One man does the work of six

Spray Painting is Fast

with a Curtis Compressor *it's Better!*

The manufacturers of the better spray guns will tell you that, in addition to quality in the gun, you must have clean air and dependability in the air supply. That's the reason why Curtis Compressors are the standard for this work—Curtis construction is the one way to get adequate lubrication and at the same time keep the lubricating oil out of the air line! You can't mix paint with lubricating oil.

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Name..... Address.....

City..... State.....

hours; fillers that can be used as putty glazing or for brush coats, and which will dry in the same time or less, and japan ground colors that dry in less than one hour. As for rubbing varnishes, these may be had that will rub in from 5 hours up, from the time they are applied and that without a trace of "sweating."

All materials that the average custom shop man can apply are available as ready made goods of high quality, and if he knows his trade and is a "practical finisher" he can do a job that will look and wear with factory work.

Stop Shop-Mixing

In a nutshell, the present day automobile painter, or any other painter or finisher for that matter, who is onto his job, does not shop-mix anything excepting perhaps his color varnishes. It doesn't pay, and with this one exception it's not as good. The main thing in favor of shop-mixed color varnish is that you are not obliged to have so much money tied up in materials. Since you can never tell what color the next job will be you can carry a stock of colors and clear varnishes, and so extend your capital.

There was a time when the lead and oil, rough-stuff, etc., that went to make the 20-coat job were all that was known, but with the advent of the gas-buggy all this went up the flue. The man who makes money in automobile refinishing today is the fellow who (1) is keeping his jobs down to from 5 to 8 coats; (2) who, with the exception of a few sets of wood wheels, doesn't use enough lead in oil in a year to give the shop boy painter's colic if he ate it all; (3) who keeps linseed oil under lock and key or for brush-keeper use only; (4) who will "try anything once" and so when any new thing comes out he knows it; and (5) who leaves it to the manufacturers to spring something new.

Set Higher Standards

With 20,000,000 cars in service, if the automobile painters would study their game and realize that the manufacturer is making and will make them anything they need—for it's the manufacturer's business and he keeps a staff of experts to advise and assist customers—if these painters would get together and find out the facts, there would not be the price cutting nor the shoe-shine jobs that are in evidence today. Nor would there be so much of the back yard painting either, for if the average job, or better yet all the jobs turned out by so-called painters, were up to factory standards, we would see much improvement in the appearance of the older cars that are on the streets today.

Supplementary Notes

The term, "flattened," which I used in the paragraph entitled "A Faster Schedule," means to kill the gloss all over, so the next coat will cling to the surface and flow out smoothly. In doing a job with one coat of ground and one coat of color varnish, it requires more skill to apply and rub to get it solid and keep it so, but it can be done. Many automobile refinishers assume that "to rub" really means "to cut to the quick." This will not do on color varnish, hence the expression, "flattened."

Further, in the same paragraph, where I included for the fifth day the operation, "flowed," this means to "flow" on the last or final coat of clear varnish. The word "finish" could be sub-

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Leading Paint Manufacturers Adopt Matthews Gun

Several of the largest paint manufacturers after testing all others have adopted Matthews Guns to use in demonstration work of their paints, lacquers and surface coatings. The Matthews Gun is bringing a new day of better work and lower finishing costs. Try out this gun and see why industry everywhere is adopting Matthews Guns.

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"Mechanical Equipment for Product Finishing" is an interesting, instructive booklet that you will be glad to read. Send for it.

A Complete Line

There is a Matthews Mechancal Painting Equipment for every type of painting, maintenance painting as well as product finishing. Get complete information. The Matthews Gun handles all types of finishing materials. One gun for all. Can be quickly adjusted from a spot the size of a dime to a 14 inch fan stroke.

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MECHANICAL PAINTING
EQUIPMENT

stituted for "flowed" here. While in the West, not so very long ago, I was in the habit of rubbing, striping and finishing a job a day, but they had real color varnishers and rubbers bringing up the work, and it was no stunt to do this.

By doing striping on color varnish it not only leaves more time for finishing, but in case of striping with gold bronze it makes it safe. It's always risky to stripe and finish in a hurry with any bronze, unless you shellac over the stripe, and this, unless done properly, has a come back.

Referring to the term "sweating" at end of paragraph entitled "Modern Materials Available," in the days past more than these times, if you were to rub varnish too quickly it would sweat out, or "silk," and if you finished over it without giving it another rub it would crack. If it was rubbed enough the first time, then there was not enough left to rub again, but that type of varnish went out long ago.

Today there are any number of finishing varnishers that will rub in from one to three days. True, to clean up and refinish we have waterproof abrasive paper instead of grinding flour pumice into the surface, and of course, we have gas washes and all kinds of tricks, but it's mostly the varnish after all. Automobile owners will not let their cars get old in the paint shop and manufacturers are making the goods required for faster and better quality work, so it's up to the automobile refinisher to speed up.

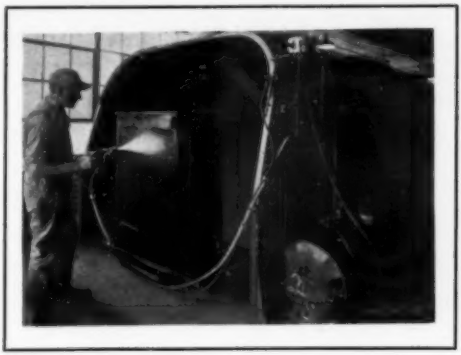
Furniture Staining

All work coming into the wood staining department should be thoroughly dusted before stain is applied. In applying stain the use of a good grade 3-in. flat fitch brush 4-in. long will be found very satisfactory, as it will carry sufficient stain for the large surfaces, and it is not too large a brush to use on the smaller surfaces—if used by an experienced stainer.

If at the end of a day's work these brushes are cleaned and laid aside dry, they will give better work and will last much longer. Whether brushes are used for water, oil, or spirit staining, the stain should be applied evenly and uniformly to give best results.

Where a combination of woods are used, such as mahogany veneered tops and panels or tops and fronts, and the balance is gum or birch, the gum or birch parts should be given a coat of the regular stain, and when this is dry stain over the entire article. This will give a uniform color on the veneered and gum parts. If birch is used it will probably be necessary to stain this twice before going over the entire article.

In touching up the sap parts of walnut where the sap often runs in very narrow streaks, a pencil brush will be found handy, applying the stain full strength and then staining the entire article with the same stain. Keeping the staining benches clean will save a great deal of time and trouble. After completing a job of one stain color, the brush and bench should be well cleaned so that one stain color will not be carried on to the next job of another color, thus causing a loss of considerable time in resanding and restaining.—John H. Steffen.



Cut out finishing room snags

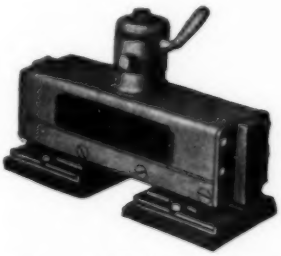
The New Multiplehead

An advanced design, made with a renewable head. This feature keeps the brush in operation should the head ever get clogged. It allows easy cleaning. This airbrush is speedy and has an even accurate spray from round to fan shape. It is light, perfectly balanced, and easy to operate, reducing fatigue.

KEEP things moving. Don't let stock pile up waiting for the finishing room to catch up with the rest of the plant.

Paasche finishing equipment—compressor, air-conditioning unit, airbrush, and ventilator—is made to keep things moving. It is all designed for airbrush service and being so designed, it offers flexibility, speed and accuracy.

Let our engineers study your finishing problem—to reduce costs and eliminate snags.



The Paasche pneumatic rubbing machine—1600 arm strokes a minute. Smoother finish and faster work, less fatigue and more uniform results. It will reduce those rubbing costs.

Paasche Airbrush Co.

1921 Diversey Parkway, Chicago

New York, 54 Dey St. — Cleveland, O., 418 Perry Payne Bldg.

Los Angeles, Cal., 411 Douglass Bldg. — Toronto, Ont., 64 Front St. W.

Paasche Airbrush Company,
1921 Diversey Parkway,
Chicago, Illinois.

Please send me further information.

Name.....
Company.....
Address.....
Articles to be finished.....
Material to be applied.....
How many airbrushes do you now use?.....
What size compressor have you?.....

IF7 Gray

Used Films for Lacquers*

Describing a product obtained by treating used motion-picture films to recover the nitro-cellulose for use in making lacquers, cements and various protective coatings.

By Woodward Lawson

ALTHOUGH the use of celluloid scrap and ordinary film scrap is an old idea in the pyroxylin industry, it has never enjoyed generous adoption. In fact, it has always been frowned upon by many authorities after bitter experience. The principal objection has always been based upon one serious shortcoming. The scrap material lacks uniformity. Gathered up here and there, one lot of it probably contains the product of several different manufacturers, each brand having an analysis of its own, which differs from all the others.

The use of film scrap heretofore has also brought about variable results. The result in the plant is bound to be confusion. Where are you? Today you get this result from this treatment, and tomorrow you get an entirely different result. Every day is an experimental day. Every batch is a new experiment. Little wonder that the men who are most interested in efficiency and quality have looked askance at this scrap material.

Careful Selection

Cinelin Chips on the other hand are the latest scientific utilization of washed film, selected according to definite analysis, and which, having served its purpose as entertainment, is used in their production. It will be of interest to note that there is approximately 500,000 pounds of this material discarded every month! This means that the phenomenal growth and demand of the pyroxylin industry will be met by an almost inexhaustible supply.

Cinelin Chips are produced by a process of washing film which requires no caustics or alkali and needs no excessive temperature. This certainly is a tremendous improvement over the methods heretofore employed. The former methods, although requiring less labor and thought, have proved to work havoc with the original chemical content of the film for the very obvious reason that caustics and high temperatures attack and decompose nitrocellulose, camphor, and other elements. By this new process the film, which has already been carefully selected as to analysis, is converted into chips with all its excellent chemical elements unaffected.

The effectiveness of this washing process is most evident in the washed material. It is clean and clear and entirely free from foreign matter, giving to solutions made from these chips a remarkable clearness and brilliancy. This product is available not only in the clear, uncolored material, but also in individual colors such as orange, amber, blue and green; or it may be had in mixed colors for dark and pigmented solutions. All material, regardless of color, undergoes this careful washing process.

*Excerpts from a survey prepared by the Cinelin Co., of Indianapolis, Ind.

"There is a time and place for everything"

Now is the time for the WORTHINGTON Vertical Compressor

THE place is with your finishing equipment.

The Worthington Vertical Compressor is built in sizes varying from 5 to 52 cu. ft. per minute. An ideal cooling system, specially designed piston and minimum clearance give more and cooler air with less oil used. The accurate balance of reciprocating parts, force feed lubrication and Worthington FEATHER (Reg. U. S. Pat. Off.) Valve insure smooth operation and longer life. All these Worthington features are embodied in a simple construction that runs quietly and requires but few adjustments. Worthington's nation-wide distribution makes immediate service possible.

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION
115 BROADWAY, NEW YORK CITY
BRANCH OFFICES IN 24 CITIES

6732-1

Analysis of the Chips

The analysis of Cinelin Chips is uniform at all times, since the film used in them is selected according to individual analysis. They are composed substantially of nitro-cellulose 90 percent and camphor 10 percent, carefully blended with stabilizer and plasticizer, which dissolve completely to low viscosity in all known solvents and in combination with dilutents such as acetone oil, amyl acetate, benzol, butanol, butyl acetate, butyl propionate, acetone C. P., ethyl acetate, methyl acetate, methyl acetone, diacetone alcohol, denatured alcohol—government formulas—Nos. 1, 2, 2A, 2B, 12A, 19, 30, etc. The chip form is to facilitate handling and to increase the rapidity of dissolving.

The presence of camphor in this product is of distinct advantage. Aside from being a latent solvent, it serves as a plasticizer and stabilizer. This directly yields a tenacious, flexible, and tough film surface.

It is well known that motion picture film base must be free from imperfections, because the minutest defect would be revealed glaringly on the screen as a result of the enormous magnification to which it is subjected. This means that Cinelin Chips come from the finest grades of material known in the manufacture of pyroxylin. They are the best that technical skill has yet been able to produce.

The moistening process with either water or alcohol required by soluble cotton is altogether unnecessary in the handling of these chips. This entirely eliminates either the additional work of dehydration or the additional expense of soaking in alcohol. The chips are stable in any average temperature and may be stored with perfect safety. This naturally means less work in handling, less care, and a reduced fire hazard.

It is a wise precaution in any plant not equipped with the sprinkler system to occasionally test the fire hose and other apparatus. In an emergeny, equipment failure may mean total destruction of the plant and danger to human lives. Accident and fire prevention are as important in industrial efficiency as a carefully planned production schedule.

LACQUERS for Autos

Extensively used, free from gum, uniform, reliable and economic. Pioneer lacquer makers who can satisfy your requirements. Write for prices.

Chas. Cooper & Co.

90 Worth St., New York

Works—Newark, N. J. Since 1857

Portable racks fitted with round iron rods which serve as brackets to support newly sprayed small flat parts, such as cabinet doors, grilles, etc. As the parts are sprayed they are placed on these racks for the finish to dry.

The Compressor for perfect spray painting

THERE'S one point you've decided on—that is to get the best spray gun manufactured. You want your paint jobs to build up your reputation.

But don't overlook this fact. No spray gun is better than the Compressor that runs it. That's why you should insist on a Model "P" Quincy. You'll get steady pressure, clean, dry air free from oil, and quiet vibrationless service for a lifetime. Quincy Compressors are built to make any kind of spray gun 100% efficient. Many manufacturers of spray guns sell Quincys as original equipment. See that a Quincy runs your paint spray outfit.

Quincy P

In five sizes. Can be furnished either with gas engine or motor drive.
In portable or stationary style

DEPT. C

QUINCY COMPRESSOR CO., Quincy, Ill.

Formerly Wall Pump and Compressor Co.

Clip and mail this ad for complete information

QUINCY COMPRESSOR CO.

Quincy Illinois

K 306

Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers.

Basket Finishing Problem

We have a large number of fireside baskets to finish in bright red, bright green and black. They are made in China, out of willow, with the handle wrapped with cane or bamboo which has a hard glass-like surface. We have not been able to make anything stick to it. We want to finish them in a lacquer or a dye that will dry at once, or so they will not need to be hung up all over the shop.

We have tried shellac first, then lacquer—all kinds of lacquers, acid treatment and sealers to no account. The best sticker is brushing lacquer but it does not stick good enough for shipping.—T. M. P. S. Co.

Iron Bed Finishing

We are finishing iron beds; probably you may suggest some improvement on my method. First, I paint them and bake up to 250 degrees, then sand and grain and bake again; then sand and varnish. Any information you may send me will be gladly accepted.—W. T. C.

Striping Furniture

Will you be kind enough to give us any practical methods that you may know about striping? We manufacture an extensive line of decorated novelty furniture, and striping seems to be one of the difficulties that we encounter. This is very important in the final operations of our furniture, and we will thank you very much if you will advise us as to the best methods we might use; or possibly there may be some small mechanism on the market that would make it easier for the decorator to do good striping.—P. C. & N. W.

Who Will Finish Toys?

We manufacture a line of wood toys and we are interested in receiving the names of several concerns that are equipped and specialize in the finishing of wood parts, either by dipping or spraying. We could keep a concern fairly busy and want someone here in the East—either in New York or some other New England state. We would appreciate your attention in the matter and wish to thank you for any courtesy you might extend.—Import Toy Co., 108 E. 16th St., N. Y. City.

Cheap Chair Finish

We are interested in new processes for finishing cheap chairs. —C. M. DeM., Monterey, N. L., Mex.

We regret that we do not feel it advisable to submit an article on finishing cheap chairs in answer to the Mexican letter for the reason that there is practically only one type of finish used in the U. S. for this class of work. It consists of one dipped coat of transparent pigment primer, followed by one dipped coat of rather low-priced clear varnish.

RAW MATERIALS DIVISION

MECCO TRADE MARK

LACQUER DIVISION

SOLVENTS
THINNERS
SOLUBLE COTTON
COTTON SOLUTIONS

We Manufacture

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and are equipped to supply standard cotton solutions and thinners or to make these up in accordance with **your** most exact **specifications.**

ACETATES { ETHYL, BUTYL, AMYL

METHYL ACETONE

METHANOL { 95%; 97% PURE Denaturing Grade

LACQUERS
AND
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Best Obtainable

For any Article Requiring a Durable Finish

Metal, Wood or Composition

Automotive and Other Trades

We Solicit Your Inquiries. Write Now!

THE MINER EDGAR CO.
110 William St. - - New York, N. Y.

If you could secure from this Mexican company in detail just what system they are now using for finishing their chairs, we could work up for you a very interesting and instructive answer, possibly pointing out some ways in which they could better their finish or cut their costs, but with the absence of any details as to just what their finish consists of, it is not possible to give any intelligent help.—R. L. Masterson.

Finished in Gold and Silver

I am interested to learn the formula and process of finishing white metal products in gold and silver burnished. The above mentioned finishes I desire to produce with spraying powders, or if you cannot give me a formula of spraying, I would appreciate your suggestion in plating.—W. I. B.

Satin Finish Copper

We are interested in ascertaining the details with reference to satin finish copper. If you can advise us just what method is used in making up velvet finished copper such as is used on cedar chests, we will be very glad if you will do so, advising us with reference to the same at the earliest possible date.—T. C. Co.

Satin finish copper fittings can be easily obtained by spraying or brushing a coat of velvet drying lacquer or varnish on top of polished copper. The lacquer finish is perfect because of its quick-drying properties and its great durability.

If the copper fittings are not too large, probably the most economical method of securing this satin finish will be to apply a coat of flat drying lacquer to the copper parts by dipping before the parts are assembled on the work.

Another method of securing a satin finish copper is by the use of copper bronze powders. This system does not require the use of copper fittings; pressed steel fittings or similar metals can be finished over to very closely resemble dull finished copper. This method calls for the mixture of one or two ounces of copper bronze powder (very finely divided and of the proper shade) and one pint of nitro-cellulose bronzing lacquer. This mixture should be applied by spraying.

If sufficient bronze powders are used and the bronzing lacquer is of the proper type, a beautiful, uniform, dull copper effect will be produced. Only enough powder should be mixed with the bronzing lacquer at one time to take care of the immediate work on hand. The material should not be allowed to stand already mixed from one day to another, because some bronze powders have a tendency to react with the bronzing liquid, to change color and to take on body upon standing for some time.

Whichever method is used, great care should be taken to see that the metal is clean and entirely free from oil or grease before the lacquer is applied; otherwise difficulty will be experienced in getting these drying and sticking properties.—I. F.

Equalizing Red in Walnut

It was asked in the May issue of INDUSTRIAL FINISHING by M. & S. F. Co. how to kill red in walnut. I find it contrary to general belief that bleaching compounds equalize or kill the red in walnut. I have never been able to accomplish the purpose by using bleach-

The Spraco Lacquered

Creates a Market for Itself By the Fineness of its Finish

Appearance does not make a fine piece of furniture, but, from a sales point of view, the lack of it may undo all the good work you have put into it. It is this quality that catches the eye of the buying public, as Tony, the fruit man, will tell you as he polishes up his apples.

When appearance is so important, can you afford not to look into the refinements of the spray method as it has been developed in the 14-A Spraco Gun, through the use of which you can get many times the speed of brush work and above all the result that will sell your product. The finest lacquer and the most skilful workman will not give this final touch that means so much unless the proper tool for applying is used and this you will find in this latest Spraco product. Invest a 2-cent stamp for Bulletin 103.

SPRACO PAINTING EQUIPMENT COMPANY

Makers of the Dependable 14-A Gun

60 High Street, Boston, Mass.

Sales and Service Stations

New York Atlanta Cleveland Chicago

ing preparations *alone* on this kind of a proposition.

The red in walnut, that was spoken of, was at one time quite a problem in my experience. After considerable difficulty along this line, the following has proven successful with us. But, first we should go back to the principle of color harmony. As red is a component of walnut color, we must look for its auxiliary color in walnut as a solution to this problem.

I take it that they have in mind and want to obtain that rich, brown, shade that is so popular today. Therefore, we must use green over the red spot, that they speak of, whether it be in your primary stain coat, or in your shading stain. As this red spot predominates we therefore, must use a very weak solution of bright green, such as Malachite green or its equivalent in strength, for overtoning or shading, dissolved in water or spirits as the case may require. A little experimenting with this solution should give gratifying results.—Edw. C. H. Rottmann.

"Motor Car Finishing"—Another Suggestion

Referring to the article "Motor Car Finishing," written by Leo J. Smith, in the June issue, several years' experience with these cleaning problems have proved to us that the most satisfactory method is to apply the Deoxidine, and to use the steel wool on deeply pitted rust as Mr. Smith has mentioned, and then, before the cleaner dries, to thoroughly wash it with large quanties of cold water.

The additional abrasive action of the sponge has been found advisable, but cold water is much more satisfactory than steam or hot water would be as applied directly on this particular cleaner. After the product of the cleaning has been completely removed with the cold water wash, the drying operation comes next, and to facilitate the drying, hot water or steam have been found advisable, and it is the practice in the large production shops to pass the bodies through a heated oven to complete the drying operation before the primer is applied.—F. H. Spruance.

More About Chemical Cleaners for Metal

We are somewhat disturbed over the article "Cleaning Metal to be Finished," by Mr. Masterson in the April issue. In this article Mr. Masterson shows our material, which is listed as No. 2 product as containing 29.46 per cent of water. The material listed as No. 1, which apparently is _____, shows no water.

As a matter of fact, a careful distillation and examination of _____ (another grade of No. 1 product) which is their standard commercial product used by practically all of their customers, will show a percentage of water very close to that shown in the analysis of our material, which is slightly low, but fairly accurate for an analysis of this type. You will appreciate our difficulties in overcoming resistance that apparently will arise in the minds of prospective customers who are not technically trained when they assume that Chromolene contains water and this other product does not.

Another point for consideration is the question of alcoholic solv-

ents. The four different materials as listed in Mr. Masterson's article all show denatured alcohol as the solvent. The solvent used in (No. 1 product) you will find to be butyl alcohol with a small percentage of denatured alcohol to make it miscible with the phosphoric acid. The solvents used in the other three materials are either ethyl acetate, ethyl methyl ketone or acetone in conjunction with denatured alcohol.

Denatured alcohol, you will find, is not a solvent for oil or grease, as is generally supposed. A simple test of trying to mix denatured alcohol and oil will result in the oil separating from the alcohol. Of the solvents used we think ethyl methyl ketone is by far the best, as it not only actually dissolves the oil permanently but is the only oil solvent that is also miscible with water in an acid solution.

You will appreciate the importance of this when you consider the acid is always rinsed from the metal with water. All of the materials used in Chromolene are miscible with water in all proportions, either collectively or individually.

Mr. Masterson shows a certain percentage of sodium dichromate in our material. Sodium dichromate could not exist in the pres-

YOU and I must admit, there are now a lot of good lacquers on the market. Neither can either of us deny, that the wide range in price does not check up with any such difference in quality.

That's why we use this advertisement to invite you to send for Daconite price and a free tryout can, so you can put its performance side by side with its price. Then you can see what we mean by *priced right.*

DACONITE

A Priced Right **LACQUER**

JAMES B. DAY & CO
224 WEST SUPERIOR ST.
CHICAGO
Manufacturers of
WOOD FINISHING MATERIALS

ence of reducing agents such as glucose or alcohol, especially in an acid solution. In the manufacture of our material we form chromic acid and reduce this to either chromium sulphate or chromous acid with a suitable reducing agent such as glucose, and we maintain the chromium in the reduced state by the addition of an excess of the reducing agent.

Competent chemists inform us that chromous acid is formed, and that is our opinion, although some chemists claim chromium sulphate is formed. The point is immaterial, however, as the reduced chromium compound functions satisfactorily in either case. The reduced chromium compound prevents the sulphuric acid from having any oxidizing influence on the metal because it of itself will become oxidized before there can be any oxidizing influence on the metal. Furthermore the inherent tendency of reduced chromium compounds to retard corrosion are well known to the chemical profession. There is 2.5 per cent of the reduced chromium compound present in our material.

In a subsequent issue of your magazine we noticed a short letter that suggested certain tests of chemical cleaners. By leaving the test tube open, naturally the chromium compound becomes re-oxidized by the influence of the oxygen from the air and again reduced by the excess of glucose until the glucose is all exhausted when the air finally maintains the chromium in the oxidized form. On a panel the same chemical action would take place.

One of our customers tried this test with both the test tube open and closed with the result that in the closed tube containing Chromolene the nail was protected by a bluish green chromium crystallization, whereas the nail in the (No. 1 product) tube showed slight indication of rust. In the open tubes the nails showed a slight amount of rust in both the Chromolene and (No. 1 product) tubes.

However, we fail to see the importance of these tests in respect to cleaning bodies for painting. As far as we know, none of our customers store Chromolene in test tubes or open vats before using. Neither do they apply it to the metal and allow the metal to stand around for two or three weeks before painting. The average manufacturer wants to clean his automobile body, paint it, and have it on the way to the dealer in three to five days.—Chemical Products Corporation.

Some Prepared Aluminum Paints Do Not Jell!

On page 39 of May issue, under the title "Liquid Aluminum Bronze," I notice R. C. E. claims that more satisfactory results are obtained by mixing aluminum paints than by buying a prepared product. I have been making aluminum paints for several of the leading paint manufacturers and guarantee that this particular product will not jell or thicken, regardless of how long it is kept in stock.—J. Baer, Long Island City.

The thorough removal of rust from the surface and crevices of automobile-body steel panels is exceedingly important.

Moisture must be present for continuous corrosion.

RED	WHITE	BLUE

Take the best Brushing Lacquer you know of in the colors above and try brushing one over the other without "picking" and with complete covering of each successive coat.

You CAN do this with ROXALIN BRUSHING LACQUER

BRUSHING PRIMER SURFACER
BRUSHING ENAMELS IN ATTRACTIVE COLORS
BRUSHING CLEAR LACQUERS

1. Positively will not lift or "pick" previous coats.
2. Flows out smoothly without brush marks.

In addition to our full line of commercial brushing, spraying and dipping lacquers we now announce

A Complete Brushing Auto Finishing System

Including Primer Surfacer and required enamels.

ROXALIN

Roxalin Flexible Lacquer Co., Inc.

Manufacturers of Lacquer Products Exclusively

105-109 Seventh Ave. Long Island City New York

Where the finish counts—use "Roxalin"

A Weatherman Who Never Fails!

RAIN—snow—zero! Extreme heat—dry—humidity! All weathers are produced in this machine by which our Paint and Varnish Engineers test materials!

Whatever your product, our Paint and Varnish Engineering Service can aid you in the finishing of your product.

PITTSBURGH PLATE GLASS CO.

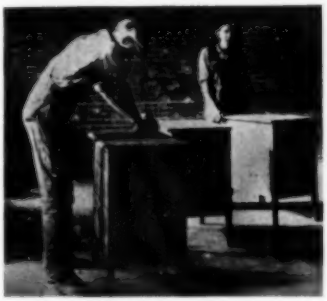
Paint and Varnish Factories—Milwaukee, Wis., Newark, N.J., Portland, Ore., Los Angeles, Cal.

Brushing, Spraying Stain

Almost every finisher who specializes in some one operation considers his particular work more important than that of any other operation. Perhaps this is as it should be, because then each operation will get the best that is in the operator. That old saying, "A chain is no stronger than its weakest link," is particularly applicable to finishing. No matter how well the varnish may be applied and rubbed, if the staining has been done carelessly, the finish will not be "a thing of beauty and a joy forever."

Considerable staining is still done with the brush, and this I will consider first. I was in a furniture factory recently, and in looking over the furniture I observed that some of the pieces had a faded appearance in places where the color should have been full depth. Arriving in the staining room I made it a point to notice how the staining was done. Here I discovered the man at work seemed afraid to wet the wood; he was almost rubbing the stain on with the brush instead of flowing it on.

If a heavy coat of stain will produce a darker effect than is desired, the thing to do is reduce the stain so that a flowing coat will give the depth of color required. Only by flowing it on can a uniform coat and a uniform result be obtained.



Rubbing after filling.

I know that in some shops workmen are afraid to apply a heavy coat of stain on veneered surfaces, through fear that it may loosen the veneer. Such fears are not well founded. If veneer is not already loose, no ordinary coat of stain that can be applied with a brush will cause it to come loose. Before veneer can be loosened in this way there must be stain enough to saturate the veneer and then saturate the glue which holds the veneer.

Here is a chance for those people who blame the finisher for everything that happens to veneer, to do some experimenting. Try and remove a sheet of veneer by repeated applications of either stain or water, and count how

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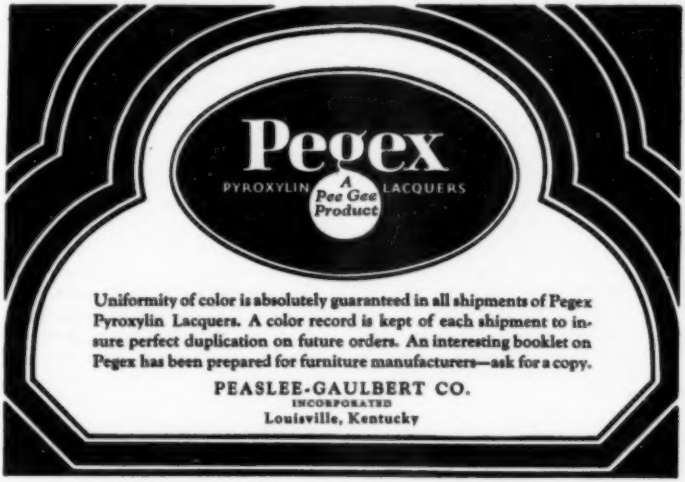

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Can your product benefit by the addition of one or all of these improvements? Would you welcome a reduction in time and cost of finishing? We offer a demonstration in your own factory under typical conditions of our Lacquers and Enamels. We offer the assistance of an expert ALAKA Technical engineer to iron out your finishing problems. You incur no obligations. We welcome the opportunity.

Three services are yours for the asking—(1) a demonstration (2) a 5-gallon sample of ALAKA Lacquers and Enamels at the drum price (3) a reference book "Finishing Facts". You are invited to avail yourself of any one or all three.

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many applications will have to be made. Anyone who thinks a coat of stain will penetrate deeply enough to affect the glue beneath, should scrape off a coat of stain and observe how little it penetrates. All this talk about stain causing veneer to blister or come loose, has no foundation in fact.

It is not always possible to detect loose veneer until the surface has been moistened with water or stain, as the veneer may be lying close to the core and yet not be attached to it. What the water stain does in such a case is merely to expand the surface of the veneer. In order to make room for the expansion the veneer raises in the form of a blister.

In this respect a water stain has an advantage over an oil stain, because an oil stain might never reveal the faulty glue joint. In fact, the faulty place might not be revealed until atmospheric changes had caused the veneer to raise, perhaps after the finishing process had been completed, and when the cost of correcting the trouble would be greatest. If there is a defect in the union between the veneer and the core, it should be discovered at the earliest possible moment either before or soon after the finishing process has started. Some concerns sponge all their veneered work before it goes to the finishing room, regardless of the kind of stain to be used. This will show up any possible defects.

When spraying stain, some operators finish up as they go along, without going over the work twice. I do not believe this is either the best or quickest way. In order to get the best possible effect from stain, a certain amount of it must be absorbed by the wood. When applying it with

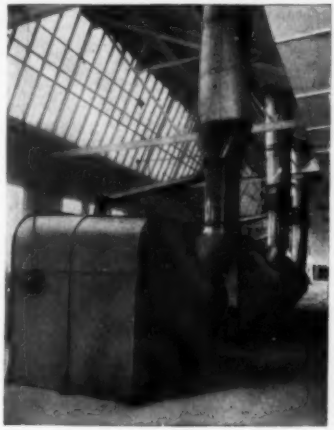
a brush it is worked into the wood; when sprayed on, it should be given a chance to soak in.

If we start one end of, say a dresser, and proceed to the other end, applying a light coat as we go along, the stain will have had a chance to soak into the one end by the time we have reached the other end. Then we can start again at the first end and repeat the operation, and in this way obtain a deeper and more uniform color.

On surfaces that are to be highlighted the above method works to perfection—when followed by a competent operator. In going over the work the second time, only the dark border is sprayed. Some finishers prefer a mild highlighted effect; others prefer a striking contrast as though a very dark finish had been wiped away to the wood during the passing years. If a striking contrast is desired, the first coat of stain over the areas to be made light, should be wiped off immediately after it is put on. It is not necessary to wipe to a feather-edge, as this can be taken care of when the next coat of stain is applied.

Different effects in high-lighting can be produced by holding the gun at different distances from the work. If one has not had previous experience in high-lighting with the spray, it is not advisable to start right to work on a first class job. The better way is to get a few boards and practice until the right kind of job can be produced.—T. L. Ulteman.

What the modern colorist has clearly departed from, are the crude and sharply vivid effects which were prevalent some years ago.



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What can we, as business men and makers of fine furniture, do with color? One of two things. We can either recognize it grudgingly and decide to use it in limited quantities on certain of our lines or we can look about us. Just observe our golf stockings, our knitted jackets, our gay cravats, our own wives and daughters whipping down the streets in their short skirts and colorful ensembles! Will we not say to ourselves "this is the age of vitality and color and we must get our business in harmony with it?"

This is the age when we bring the sunlight into our homes. If the rooms happen to face the north, we simulate sunlight by warm orange and maroon shades applied to the floors, the walls, or the furniture. We make our breakfast rooms bright and cheerful. We lighten up a dark corner with a vermillion side chair. We place nasturtiums on an apple-green gate leg table and during the summer we permit

blooms and fresh paint to take the place of winter draperies.

I believe that the furniture industry, in view of its wonderful progress in the last few years and its ready response to the highest standards of public tastes, should take the lead in using color in all its many forms to bring lasting beauty into our every day environment. The difference between rich pageantry and drab existence in the American home is, after all, only a matter of forethought combined with an appropriate use of color.—Excerpts from talk by Capt. H. Ledyard Towle of the du Pont Co., May 11, at Asheville, N. C., before the Southern Furniture Mf'g'r's. Assn.

The electric heater, when used at the spray booth, is connected between the air-hose connection and the air regulator, and is used only for the spraying of varnish and enamels. It is employed for the purpose of heating the air as well as the fluid. An electric switch controls the heating element, allowing the operator to control the temperature as desired. The air passes through one section, and the fluid through another.

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